CARSHALTON BOYS SPORTS COLLEGE

Excellence * Character * Aspiration

TECHNOLOGY DEPARTMENT - A LEVEL DESIGN & TECHNOLOGY

Vocabulary Booklet

YEAR 12

Tier 2 & Tier 3 Design & Technology Vocabulary

WJEC Eduqas A Level Product Design (A602QS) | Expected & Aspirational

Unit 1: Design & Innovation	Unit 2: Materials, Processes & Manufacture	Unit 3: Sustainability, Ethics & Human Responsibility	Unit 4: Marketing, Public Interaction & Strategy

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Academic Year 2026-2027 | **For students, parents and carers**

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A Note for Students, Parents and Carers

Why Vocabulary Matters at A Level

This booklet accompanies the Year 12 A Level Design and Technology: Product Design Scheme of Work. It is one of the most important learning resources available to you as you meet this vocabulary for the first time.

Year 12 is the year in which all seven Eduqas theory topics are taught for the first time, in parallel with a structured sequence of NEA work: the Product Investigation (Phase 1), the Architecture Model (Phase 2), the Mock NEA perfume bottle (Phase 3) and the launch of the Real NEA (Phase 4). The vocabulary in this booklet is the same vocabulary you will be examined on in the Eduqas Component 1 written examination at the end of Year 13 - building secure, accurate understanding now means you will not be learning these terms for the first time under exam pressure.

* AO3 (analyse, interpret and evaluate): the extended writing questions that dominate the Year 12 mock assessments and the January/June mocks require not just knowledge but the ability to deploy precise technical vocabulary in service of a structured argument.
* AO4 (demonstrate and apply knowledge and understanding): even short-answer questions reward students who use correct terminology precisely rather than approximate descriptions.

Every word in this booklet appears in the Eduqas specification, the published mark schemes, or the examiner reports for the qualification. Learning them accurately now, in Year 12, while the theory is being delivered for the first time, builds the foundation that Year 13 revision will deepen and sharpen.

How this Booklet is Organised

Four thematic units group the seven theory topics by conceptual theme:

* Unit 1 - Design, Innovation & Product Development: Topics 1 (Design and Innovation) and 5 (Product Analysis).
* Unit 2 - Materials, Processes and Manufacture: Topics 2 (Materials), 3 (Processes) and 4 (Industrial Practice).
* Unit 3 - Sustainability, Human Responsibility and Ethics: Topic 6 (Human Responsibility).
* Unit 4 - Marketing, Public Interaction and Design Strategy: Topic 7 (Public Interaction).

Within each unit, words are marked E (Expected) or A (Aspirational) - see Tier Markers on page 4.

How to Learn Vocabulary by Heart — Metacognitive Strategies

At A Level, vocabulary learning must go beyond memorising definitions. You need to deploy terms fluently in extended writing under timed examination conditions. These five strategies, used systematically, will achieve that.

1. Look, Cover, Write, Check

Look at the word and definition. Cover both. Write the word and its full definition from memory. Check every word exactly - including spelling. Effortful retrieval is what builds long-term memory. Copying without covering produces familiarity without recall.

2. The Leitner System (Spaced Flashcards)

Make flashcards with the term on one side and a full definition plus one specific A Level example on the other. Sort into three piles: daily (don't know), every three days (know fairly), weekly (know well). Words retrieved incorrectly return to Pile 1. Two weeks of consistent use will produce a measurable improvement in retrieval speed.

3. Dual Coding - Word + Diagram + Sentence

For every technical process or structural term, draw a diagram alongside the definition. A labelled diagram of the injection moulding process - shot of molten polymer, runner, gate, cavity, ejector pins - stored alongside the written definition is more reliably recalled than either alone. The brain encodes images and language in parallel circuits, and both reinforce each other.

4. Use the Word in Extended Writing

A word used correctly in a structured analytical paragraph is a word you own. For every Aspirational word, write one paragraph (80-120 words) that uses it in the context of a 12-mark exam question. 'Total quality management is a manufacturing philosophy in which... This is relevant to a manufacturer of [named product] because...' Extended writing is both the practice and the test.

5. Self-Quizzing Out Loud

Define the term aloud, in complete sentences, without looking at your notes. Then check. If you hesitate, the word is not secure. Spoken retrieval under time pressure is the closest simulation of examination conditions available outside the exam room. Teach the term to a friend or family member - the most powerful test of genuine understanding is whether you can make someone else understand it.

A Weekly Routine That Works

* Monday - 20 minutes: Look-Cover-Write-Check on this week's new words.
* Wednesday - 20 minutes: Leitner-system review of all current flashcards.
* Friday - 20 minutes: Self-quiz out loud, then write one analytical paragraph using five words accurately.

Tier Markers - Expected and Aspirational

Every word in this booklet is marked in the right-hand column:

E — Expected

Every Year 12 student must be able to define and accurately deploy these terms by the end of the relevant phase. These are the minimum requirement for A Level examinations. An inability to use Expected vocabulary precisely will prevent access to Band 3 on any extended writing question.

A — Aspirational

Vocabulary for students targeting A* and A grades. These terms appear in published mark schemes for Band 4-5 answers. Using Aspirational words accurately and in context in extended writing is the distinguishing feature of the highest-scoring answers in Eduqas examiner reports.

Every mark scheme for 12-mark AO3 questions rewards 'precise terminology deployed in service of analytical argument'. Expected vocabulary gets you to Band 3. Aspirational vocabulary, used accurately and in context, takes you to Band 4-5. The difference between a B and an A is very often this.

Unit 1 — Design, Innovation & Product Development

Topics 1 & 5 — Design and Innovation (2.2-1) + Product Analysis (2.2-5). Taught from Week 5 (Phase 1) and applied throughout the Architecture Model and Mock NEA. The language of the design process, iterative thinking, design movements and product evaluation.

Design, Innovation & Product Development

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
iterative design	noun	A design methodology in which the designer repeatedly cycles through designing, testing, evaluating and refining, with each cycle improving on the last.	The Architecture Model project demonstrates iterative design directly: an initial card model reveals a wall panel does not sit square, the joining method is changed, and the structure is rebuilt and retested before final assembly.	E
concurrent engineering	noun	A design and development approach in which different stages of a project - design, materials specification, manufacturing planning, tooling - are developed simultaneously by specialist teams, reducing overall development time.	A major fragrance manufacturer uses concurrent engineering so that while the industrial designer refines the bottle form, the materials engineer selects the glass formulation and the toolmaker begins designing the mould - all at the same time.	E
morphological analysis	noun	A systematic design tool in which the functions of a product are listed, and for each function multiple alternative solutions are generated, allowing novel combinations to be identified.	A morphological analysis chart for a perfume bottle lists rows for body form, body material, closure type, dispensing mechanism and surface finish - selecting a different option from each row generates a genuinely distinct design direction.	E
performance specification	noun	A specification defined in terms of what a product must do (measurable performance outcomes) rather than what it must look like or be made of.	A performance specification for the mock NEA perfume bottle states: 'Must achieve a minimum aesthetic rating of 4/5 from 5 target users aged 18-30' - not the vague 'must look good'.	E
design constraint	noun	A limitation on a design solution that is non-negotiable - arising from physical, regulatory, financial or contextual requirements that cannot be overridden.	Design constraints on the mock NEA perfume bottle include: must be manufacturable using the available centre lathe, silicone moulding and laser cutting facilities, and must use materials available within the department's budget.	E
reverse engineering	noun	The process of analysing an existing product in detail to understand its design principles, materials, processes and decisions, typically to inform new design work or to create a compatible product.	Reverse engineering the investigation's aerosol body reveals: aluminium impact extrusion, a single-piece can construction, and a crimped seam at the valve cup - knowledge that directly informs the mock NEA brass turning decisions.	E
design classic	noun	A product widely regarded as having achieved a perfect balance of form, function, aesthetics and cultural resonance, remaining relevant and desirable long after its introduction.	The Chanel No.5 bottle, virtually unchanged since 1921, is a design classic - its Art Deco-influenced rectangular form and faceted stopper are studied directly in the Phase 1 investigation.	E
user-centred design (UCD)	noun	A design philosophy and process in which the needs, limitations, context and experience of the end user are prioritised at every stage of design and development.	A UCD approach to the mock NEA perfume bottle requires primary research with target users before any sketching begins - their grip preferences, purchasing priorities and aesthetic responses directly shape the specification.	E
Bauhaus	noun	An enormously influential German design school (1919-1933) whose philosophy synthesised fine art, craft and industrial design under the principle that form should follow function.	Bauhaus principles - minimal ornamentation, geometric clarity, honest materials - are directly contrasted with the Art Deco luxury aesthetics studied in the perfume bottle investigation.	E
Memphis design movement	noun	A radical Italian design group founded by Ettore Sottsass (1981-1988) characterised by bright clashing colours,	A Memphis-influenced perfume bottle concept might feature bright clashing colours and deliberately asymmetric geometric form -	E

Design, Innovation & Product Development

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
		bold geometric patterns, postmodern irreverence toward Modernist functionalism.	directly transgressing the restrained luxury aesthetic of the investigation's glass bottle.	
intellectual property (IP)	noun	Legal rights protecting creative and inventive work. In design: patents (inventions), registered designs (appearance), trademarks (brand identity) and copyright (creative expression).	The investigation's IP analysis page asks why Chanel protects the No.5 bottle shape as a registered design rather than a patent - registered design protects the visual appearance, which is the commercially valuable element.	E
product data management (PDM)	noun	Software systems that manage digital design data (CAD files, specifications, BOMs, test results) across a development team, ensuring version control, access management and design integrity.	A PDM system prevents two engineers from simultaneously modifying the same CAD file, maintains a full revision history, and automatically updates the bill of materials when a component dimension changes.	A
Dieter Rams's 10 principles	noun	A highly influential design philosophy articulated by Braun's chief designer (1950s-1990s): good design is innovative, makes a product useful, is aesthetic, makes a product understandable, is unobtrusive, is honest, is long-lasting, is thorough to the last detail, is environmentally friendly, and involves as little design as possible.	Dieter Rams's tenth principle - 'less, but better' - is the philosophical anchor of the Modernism timeline studied in Phase 2's design movements lesson, and a deliberate counterpoint to Memphis postmodernism.	A

Unit 2 — Materials, Processes and Manufacture

Topics 2, 3 & 4 — Materials (2.2-2), Processes (2.2-3), Industrial Practice (2.2-4). Taught first, from Week 1, to directly support the Phase 1 Product Investigation. The technical language of materials science, manufacturing and industrial production.

Materials, Processes and Manufacture

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
tensile strength	noun	The maximum stress a material can withstand when being stretched or pulled before fracture. Measured in MPa (megapascals).	The Phase 1 investigation compares the aerosol's aluminium body (tensile strength approximately 90-200 MPa depending on alloy) against the glass bottle's much lower tensile strength but higher compressive strength - explaining why glass fractures rather than bends under impact.	E
compressive strength	noun	The maximum stress a material can withstand when being compressed or crushed before fracture.	Soda-lime glass has high compressive strength but very low tensile strength, which is why the perfume bottle investigation must explain why the bottle survives being squeezed in a handbag but shatters if dropped onto a hard edge.	E
ductility	noun	A material property describing its ability to deform significantly under tensile stress before fracture; the capacity to be drawn into wire.	Brass has good ductility, which is why it is selected for the mock NEA's lathe-turned atomiser collar - it can be machined to a fine thread without cracking.	E
impact extrusion	noun	A cold-forming manufacturing process in which a metal slug is forced through a die under high impact force to form a hollow component, typically used for aluminium cans and aerosol bodies.	The investigation's aerosol body analysis requires students to draw the impact extrusion process stage-by-stage: aluminium slug placed in the die, punch strikes the slug, metal flows up around the punch to form the can wall.	E
thermoplastic	noun	A polymer that softens when heated and can be reshaped; the process is reversible, making thermoplastics recyclable. Examples: ABS, polypropylene, HIPS, nylon, acrylic, PET.	PET is the thermoplastic used for the investigation's mass-market plastic perfume bottle - it can be injection moulded into the bottle body, and unlike the luxury glass bottle, the moulding tool cost is recovered quickly at the volumes involved.	E
thermosetting polymer	noun	A polymer that undergoes an irreversible chemical change when heated, forming a rigid cross-linked structure that cannot be remelted. Examples: epoxy resin, GRP, kevlar.	The mock NEA's silicone mould making and two-part resin casting process uses a thermosetting resin: once mixed with its hardener, the chemical cross-linking reaction is irreversible, which is why the casting cannot later be remelted and reused.	E
injection moulding	noun	A manufacturing process in which molten thermoplastic is injected under high pressure into a closed mould tool; after cooling, the mould opens and the component is ejected.	The investigation's cap and closure analysis page identifies injection moulding as the process used for both perfume bottles' caps - the comparative processes table records mould cost, cycle time and suitable production volume for each.	E
just-in-time (JIT)	noun	A production strategy in which materials, components and sub-assemblies are ordered and delivered precisely when needed for production, eliminating storage costs and reducing waste.	JIT is studied in Week 4 alongside the investigation's industrial context page, where students justify the production scale of each of the 3 products with reference to tooling cost, volume and market.	E
total quality management (TQM)	noun	A management philosophy in which quality assurance is embedded throughout the entire organisation rather than confined to end-of-line inspection; every employee is responsible for quality.	The Architecture Model's 6-criterion QC checklist, written by each student in Week 8, is a small-scale application of the TQM principle: quality is checked at every stage, not only at the end.	E

Materials, Processes and Manufacture

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
critical path analysis (CPA)	noun	A project management technique that identifies the sequence of tasks that determines the minimum time to complete a project (the critical path) and all tasks that must be completed on schedule to avoid delaying the whole project.	CPA is taught directly through the Architecture Model's Gantt chart task: students identify which of the 5 main tasks - working drawings, cutting, assembly, finishing, evaluation - sits on the critical path, and what happens if it overruns.	E
Six Sigma	noun	A quality management methodology targeting a defect rate of fewer than 3.4 defects per million opportunities, using statistical analysis and structured problem-solving (DMAIC: Define, Measure, Analyse, Improve, Control).	Motorola developed Six Sigma in the 1980s to reduce manufacturing defects in electronic products. At Six Sigma quality, a production run of one million components would contain fewer than 4 defects.	A
economies of scale	noun	The reduction in unit cost that occurs as the scale of production increases, arising from fixed costs being distributed across more units, bulk material purchasing and production line efficiencies.	The Week 4 calculation task asks students to work out the unit material cost of 100 bottles from GBP450 of material, then list 4 factors that change at 50,000 units - directly applying economies of scale to the investigation context.	A

Unit 3 — Sustainability, Human Responsibility and Ethics

Topic 6 — Human Responsibility (2.2-6). Introduced in Week 4 alongside the investigation's sustainability analysis, and deepened during the Architecture Model project. The language of environmental analysis, ethical design, consumer rights and values in design decision-making.

Sustainability, Human Responsibility and Ethics				
Word / Term	**Type**	**Definition**	**Example in A Level Design & Technology**	**Tier**
life cycle assessment (LCA)	noun	A systematic, standardised analysis of the environmental impact of a product across all stages of its life: raw material extraction, processing, manufacturing, distribution, use, end-of-life and disposal.	LCA of a smartphone reveals that 80% of its lifetime carbon footprint is generated before first use - in the mining of rare earth metals, semiconductor fabrication and international logistics. Design for longevity and repairability is therefore the highest-impact intervention.	E
TEASEM	noun (acronym)	A values framework for evaluating design decisions: Technical, Economic, Aesthetic, Social, Environmental, Moral. Used to analyse the full range of factors affecting a design choice.	TEASEM applied to choosing virgin versus recycled ABS for a product casing: Technical (recycled may have reduced impact strength), Economic (recycled typically 15-20% cheaper), Aesthetic (colour variation), Social (signals sustainability credentials), Environmental (reduced crude oil consumption, lower embodied carbon), Moral (responsibility to future generations).	E
circular economy	noun	An economic model in which materials are kept in circulation for as long as possible through repair, remanufacture, reuse and recycling, eliminating the concept of waste.	A circular economy approach to product design requires design for disassembly: snap-fit fixings rather than adhesives, monomaterial components rather than laminates, component labelling with material codes, and modular architecture enabling part replacement.	E
cradle-to-grave	noun	A lifecycle analysis framework that traces a material or product from extraction of raw materials ('cradle') through all processing and use stages to its final disposal ('grave').	A cradle-to-grave analysis of a PET plastic bottle includes: petroleum extraction (cradle), refining, polymerisation, bottle manufacture, filling, distribution, retail, consumer use, collection and landfill or incineration (grave).	E
cradle-to-cradle	noun	A lifecycle framework (coined by Braungart and McDonough) in which all materials are designed to remain perpetually in biological or technical nutrient cycles, eliminating waste entirely.	A cradle-to-cradle product uses only monomaterials that can be fully separated, recycled without degradation and re-entered into the technical nutrient cycle - rather than the mixed-material laminates that characterise most electronics.	E
embodied carbon	noun	The carbon dioxide equivalent emissions generated by the extraction, processing, manufacture and transport of a material, prior to use in a product.	Concrete has high embodied carbon (approximately 0.1 tCO2e per tonne for standard concrete) due to the calcination process in cement production. Specifying low-carbon concrete substitutes (GGBS, fly ash) can reduce embodied carbon by 40-80%.	E
inclusive design	noun	A design approach that aims to produce products, services and environments that are accessible and usable by the widest possible range of people, regardless of age, disability or other characteristics.	Inclusive design of a domestic product considers grip for users with reduced hand strength, legibility of controls for users with low vision, and ease of operation with one hand - not as 'special needs' features but as properties that benefit all users.	E
product liability	noun	The legal responsibility of a manufacturer or seller for injury or damage caused by a defective product, under the Consumer Protection Act 1987 (UK) and analogous legislation internationally.	Under product liability law, a manufacturer is strictly liable for injury caused by a design defect even without negligence. A sharp internal edge on an injection-moulded toy that injures a child creates liability even if the defect was not foreseeable.	E

Sustainability, Human Responsibility and Ethics

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
design for manufacture (DFM)	noun	A design approach that optimises a product's form and construction for ease, efficiency and economy of manufacture - typically reducing part count, minimising assembly steps and selecting appropriate tolerances.	DFM applied to a consumer product might: consolidate a 4-part assembly into a single injection-moulded shell (eliminating fasteners), standardise screws to one type (reducing assembly time), and specify tolerances as loose as function allows (reducing scrap rate).	E
planned obsolescence	noun	A design strategy in which a product is deliberately designed to have a limited useful lifespan, either through physical degradation or through aesthetic or technological obsolescence, stimulating replacement purchases.	Critics argue that smartphone manufacturers practice planned obsolescence through: proprietary screws preventing repair, batteries bonded with adhesive, software updates that reduce performance on older models, and annual design refreshes that make previous models appear dated.	E
systems thinking	noun	A design and analytical approach that considers a product, service or organisation as a system of interrelated components rather than a collection of independent parts.	Systems thinking applied to a domestic product reveals that improving the motor efficiency has downstream effects on battery life, casing thermal requirements, user experience and end-of-life battery disposal - all of which must be designed for simultaneously.	A
circular design	noun	An application of circular economy principles to the product design process: designing for disassembly, monomaterials, component longevity, repairability and material recovery at end of life.	Circular design of a table lamp would specify: a single thermoplastic for the body (facilitating recycling), clip connections rather than adhesive (enabling disassembly), a standardised LED module (enabling replacement), and surface finish through texture rather than paint (avoiding contamination of the recyclate).	A

Unit 4 — Marketing, Public Interaction and Design Strategy

Topic 7 — Public Interaction (2.2-7). Introduced during the Phase 1 investigation's market research pages and taught in full during Phase 2. The language of commercial design, marketing strategy, innovation diffusion and the relationship between design and market.

Marketing, Public Interaction and Design Strategy

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
4Ps (marketing mix)	noun	The four key variables in a marketing strategy: Product (what is offered), Price (at what cost), Place (through which channels), Promotion (how it is communicated). Also extended to 7Ps with People, Process and Physical Evidence.	The 4Ps for a premium ergonomic chair: Product (ergonomic lumbar support, adjustable armrests, breathable mesh), Price (GBP800 premium tier), Place (direct-to-consumer website + specialist office suppliers), Promotion (LinkedIn B2B advertising, back pain influencer partnerships).	E
product life cycle	noun	A model describing the stages through which a product passes commercially: Introduction (low sales, high costs), Growth (rapid sales increase), Maturity (peak sales, high competition), Decline (falling sales).	Managing a product at maturity requires strategies to extend the cycle: product refinement (new features), market development (entering new geographies), price reduction (to defend share against new entrants), or planned obsolescence (stimulating replacement).	E
technology-push	noun	An innovation dynamic in which a new technology enables products that were not previously possible and creates markets that did not previously exist.	The invention of high-capacity lithium-ion batteries was a technology-push innovation that enabled smartphones, electric vehicles and cordless power tools - markets that did not exist in their current form before the technology was available.	E
market-pull	noun	An innovation dynamic in which identified consumer needs or market gaps drive the development of new products or technologies to address them.	The growing consumer demand for plant-based proteins (identified through market research) was a market-pull driver for companies like Impossible Foods and Beyond Meat - the technology was developed in response to an identified need.	E
diffusion of innovation	noun	The process by which a new product or technology spreads through a population over time. Everett Rogers's model identifies five adopter categories: Innovators, Early Adopters, Early Majority, Late Majority, Laggards.	3D printing followed a classic diffusion curve: adopted by engineering innovators in the 1990s, early adopters in design studios by 2005, mainstream desktop printers reaching the early majority by 2013, with consumer-grade machines still spreading through late majority households in the 2020s.	E
planned obsolescence	noun	A design or marketing strategy that deliberately limits a product's lifespan or perceived currency, stimulating repeat purchase.	Planned obsolescence is both an industrial practice (shorter product cycles, proprietary components) and an ethical controversy: the EU's Right to Repair legislation directly challenges manufacturers whose design choices make repair uneconomical.	E
above-the-line marketing	noun	Mass media advertising directed at a broad audience: television, radio, cinema, print and outdoor media. High reach but lower targeting precision.	A new consumer electronics product might use above-the-line marketing (television advertising, outdoor billboards) at launch to build brand awareness, then shift to below-the-line as the product matures.	E
below-the-line marketing	noun	Targeted, direct marketing activities: point-of-sale, direct mail, email campaigns, social media, sponsorship, product sampling. Higher targeting precision but lower mass reach.	A professional design tool uses below-the-line marketing: targeted LinkedIn advertising to industrial designers, free trial downloads with usage analytics, peer referral programmes and YouTube tutorials - all reaching a defined professional community rather than a mass audience.	E

Marketing, Public Interaction and Design Strategy

Word / Term	Type	Definition	Example in A Level Design & Technology	Tier
brand equity	noun	The commercial value of a brand beyond its functional product attributes, arising from consumer associations, loyalty, perceived quality and cultural cachet.	Apple's brand equity means that consumers pay a significant premium over equivalent-specification Android devices: the brand signals design quality, ease of use and social status in ways that functional specification alone does not.	E
Ansoff matrix	noun	A strategic planning framework identifying four growth options: Market Penetration (existing products, existing markets), Market Development (existing products, new markets), Product Development (new products, existing markets), Diversification (new products, new markets).	A domestic appliance manufacturer using the Ansoff matrix might: pursue market penetration through promotion (lower-risk), market development by entering Asian markets, product development by adding a robot vacuum to its range, or diversification by entering smart home security - in ascending order of risk.	E
disruptive innovation	noun	An innovation that initially targets overlooked market segments with a simpler, cheaper product, then improves until it displaces established competitors from mainstream markets.	Digital photography was a disruptive innovation: early digital cameras offered inferior quality to film, appealing only to snapshooters. As sensors improved and costs fell, digital photography displaced film in every market segment, destroying Kodak's business within a decade.	A
minimum viable product (MVP)	noun	A product with sufficient features to satisfy early adopters and collect the maximum amount of validated learning about customers with minimum effort and cost.	Dropbox launched as an MVP: a two-minute video explaining the cloud storage concept before any functional product existed, generating 75,000 sign-ups and validating the market without a single line of code.	A